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This diagram shows an exploded perspective view of a lock assembly. At the top is a rectangular housing (1) with a front panel (14) and a latch mechanism (16). Below the housing is a cylindrical component (8) mounted on a base (7). A key (13) is shown inserted into the base. To the right, a U-shaped component (5) is shown, which appears to be a part of the latch mechanism. Various other parts are labeled with numbers: 4, 6, 14, 22, 15, 17, 18, 21, 20, 19, 10, 11, 12, 3, and 9.

The invention relates to stay arm assemblies, for example those which may be used with sash windows. There is disclosed a stay arm assembly for a window, comprising a stay arm, a retainer (3) for retaining the stay arm in a desired position in which the window is opened or closed, a ring (4) which passes around the stay and which can be locked to or unlocked from the retainer by use of a key (13). The key can only be operated when a locking means (12) for locking the retainer aligns to a set position with respect to the retainer. The disclosure addresses the problems in providing a secure but easily usable stay assembly for a window.

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STAY ARM ASSEMBLIESTechnical Field

5 This invention relates to stay arm assemblies, and is concerned particularly although not exclusively with such assemblies for use with opening sash windows.

Background Art

10 British Patent Specifications Nos. 2 162 242 and 2 178 477 disclose stay arm assemblies that may provide window stays of improved security. They may allow a sash window to be opened only by a limited amount, insufficient to allow passage of an average sized person through the window opening. In order to open the window further, it  
15 is necessary to bring the window into a position in which it is substantially closed (which in the context of this specification means actually closed or just slightly ajar), whereupon the stay means may be released. It will be appreciated that, in this way, it is intended that the  
20 stay means may be released only from the inside, and not by a would-be intruder.

Disclosure of the invention

25 Preferred embodiments of the present invention aim to provide window stays having an improved locking arrangement.

More generally, according to a first aspect of the invention, there is provided a stay arm assembly  
30 comprising:

a stay arm;

a retainer for retaining the stay arm in at least one  
35 desired position;

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a ring which passes around the stay arm and engages the retainer so as to allow limited sliding movement of the stay arm with respect to the retainer and the ring; and

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releasable locking means for locking the ring on the retainer and being releasable to allow the ring to be disengaged from the retainer to permit extended movement of the stay arm with respect to the retainer, the locking means comprising a locking member which engages with the retainer and a key for actuating the locking member, the ring being provided with a hole through which the key may pass, and the arrangement being such that the key may pass through the hole to actuate the locking member, only when the retainer and the ring are in a predetermined angular juxtaposition.

Preferably, said locking member comprises a projection which is moveable towards and away from a position in which it projects from the retainer to prevent the ring from being removed from the retainer.

Preferably, said locking member comprises a screw-threaded member which engages a tapped bore in said retainer and is screw-threadedly adjustable towards and away from said position.

Preferably, said screw-threaded member comprises a grub screw.

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Preferably, said screw-threaded member has a flared head and said bore has a flared mouth with which said head engages to limit travel of the screw-threaded member within said bore.

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Said screw-threaded member may have a head formed with a polygonal socket and said key may comprise a polygonal spigot to engage said socket.

5       The assembly may further comprise a plate which is so interposed between said stay arm and said ring as to at least partly cover said locking member.

10       Preferably, there is provided adjacent said hole an abutment surface against which a head of said locking member may abut, to prevent movement of said locking member into a position in which its head engages with said hole.

15       An abutment surface, for example the said abutment surface, may be provided on said plate.

Preferably, said retainer comprises a pin which engages the stay arm and/or the ring.

20       Preferably, said juxtaposition corresponds to a closed position of a closure member with respect to a frame, to which closure member and frame said stay arm and retainer are secured, in use.

25       The assembly may be adapted for use with an opening sash window, the stay arm and retainer being adapted to be secured to an opening sash and a frame of a window.

30       The invention includes a stay arm assembly comprising;

a stay arm;

a retainer for retaining the stay arm in at least one desired position; and

35       a ring which passes around the stay arm and engages the retainer so as to allow limited sliding movement of

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the stay arm with respect to the retainer and the ring;  
and

releasable locking means for movably locking the ring  
to the retainer such that the ring is angularly moveable  
5 with respect to the retainer said locking means being  
accessible for effecting a release operation thereof to  
allow the ring to be disengaged from the retainer only  
when the retainer and the ring are in a predetermined  
angular alignment.

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The invention also extends to an opening sash window  
as above, provided with a stay arm assembly according to  
the first aspect of the invention.

15 Description of the drawings

For a better understanding of the invention and to  
show how the same may be carried into effect, reference  
will now be made, by way of example, to the accompanying  
diagrammatic drawings, in which:

20

Figure 1 is an exploded perspective view of parts of  
a window stay arm assembly, shown as one example of an  
embodiment of the invention;

25

Figure 2 is a cross-sectional view of the stay arm  
assembly of Figure 1, when in use with a stay arm; and

30

Figure 3 is a perspective view of a plate for use in  
an alternative embodiment of the invention.

Best mode for carrying out the invention

The stay arm assembly 1 shown in Figures 1 and 2  
comprises a stay arm 2 (not shown in Figure 1), a retainer  
3, a ring 4, and a plate 5.

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By way of example, it is assumed that the retainer pin 3 is secured to a window frame, and the stay arm 2 is secured to an opening window sash which is pivotally mounted in the frame.

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The stay arm 2 is an elongate member of generally inverted channel section, formed on its underside with a series of blind holes 6.

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The retainer 3 is in the form of an upstanding pin which is secured to a base 7, and has an upstanding spigot 8, which may selectively engage in one of the blind holes 6 provided on the underside of the stay arm 2. The base 7 of the retainer 3 is provided with apertures 9 by means of which the base 7 may be secured to a window frame. The

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pin 3 is formed with a transverse horizontal bore 10 which receives a grub screw 11 having a head 12 which is formed with a hexagonal recess, with which a correspondingly shaped hexagonal shaft of a key 13 may engage.

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The ring 4 defines a through passage 14 in which the plate 5 is located and through which the stay arm 2 passes. The base of the ring 4 is provided with an aperture 15, through which the retainer pin 3 may pass. A side wall of the ring 4 is formed with a hole 16, through which the shaft of the key 13 may pass.

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The plate 5 is formed with a cut-out portion which comprises a larger, approximately semi-circular recess 17, a smaller, substantially semi-circular recess 18, and a substantially rectangular recess 19. Parallel side edges 20 of the plate 5 are curved to protrude upwardly and downwardly. Another edge 21 of the plate 5 which extends at right angles to the curved edges 20 has a curved lower surface, which corresponds with a similarly shaped portion

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22 in the through passage 14 in the ring 4. The parts 21 and 22 co-operate to ensure that the plate 5 can be placed within the ring 4 only in one orientation.

5           When the parts shown in Figure 1 are assembled with the stay arm 2, as illustrated in Figure 2, the ring 4 serves to retain the stay arm 2 in engagement with the retainer 3.

10           In the position illustrated in Figure 2, the grub screw 11 protrudes from the retainer pin 3, and is disposed substantially in the larger, semi-circular recess 17 of the plate 5. Upon lifting the stay arm 2, the respective blind hole 6 disengages from the upstanding  
15           spigot 8, and it is possible to open the window a limited amount, during which the stay arm 2 undergoes sliding movement with respect to the retainer pin 3 and the ring 4, and the stay arm 2 and ring 4 both undergo rotational movement with respect to the retainer pin 3. Upon  
20           dropping the stay arm 2, the spigot 8 may engage with another blind hole 6, to retain the window in a desired open position.

25           Generally, this mode of operation is similar to that described in my abovementioned U.K. Patent Specification No. 2 178 477, to which the reader may refer for further information.

30           During this limited movement of the stay arm, the protruding grub screw 11 serves to prevent the ring 4 from being detached from the retainer pin 3. The smaller, semi-circular recess 18 of the plate 5 abuts against the retainer pin 3, and as the plate 5 rotates about the pin 3, together with the stay arm 2 and the ring 4, the grub  
35           screw 11 is accommodated within the larger, generally



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semi-circular recess 17, to afford free rotational movement of the parts. When the ring 4 and plate 5, together with the stay arm 2, are rotated with respect to the retainer pin 3 - that is, when the window is in  
5 anything but a closed position, the hole 16 in the ring 4 and the rectangular recess 19 in the plate 5 are out of register with the grub screw 11. Therefore, it is impossible to access the grub screw 11 by means of the key 13.

10

If it is desired to open the window beyond the limited amount permitted, it is necessary firstly to bring the window into a closed position, such that the grub screw 11 is aligned with the apertures 19 and 16 in the  
15 plate 5 and ring 4. Then, the shaft of the key 13 may be passed through those apertures 16 and 19 to access the head of the grub screw 11, which may then be rotated clockwise, until it is fully screwed into the retainer pin 3. In this position, the grub screw 11 is substantially  
20 flush with both sides of the retainer pin 3. The far side of the grub screw 11 may abut against the edge of the smaller semi-circular recess 18 in the plate 5, to prevent any further movement of the grub screw 11.

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With the grub screw 11 thus retracted within the retainer pin 3, the stay arm 2 can be lifted upwardly, bringing with it the retainer 4 and plate 5, which then lifts simply over the pin 3. Thus, the stay arm 2, ring 4 and plate 5 may be totally disengaged from the retainer  
30 pin 3, and the window may be opened as wide as is wished.

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To re-engage all of the parts, the stay arm together with the ring 4 and plate 5 is dropped simply over the retainer pin 3. The window must be brought into the closed position, so that the grub screw 11 is again in

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register with the openings 16 and 19 in the ring 4 and plate 5. Then, the grub screw 11 may be accessed by the key 13, which is then rotated anticlockwise a predetermined number of times, to unscrew the grub screw 11 out again, until it is substantially in the position illustrated in Figure 2. In this condition, the stay arm assembly is again locked together, so that the window may be opened only a limited amount.

10       The hole 16 in the side of the ring 4 is preferably somewhat elongate, to allow some tolerance in how perfectly a window must be closed, to facilitate locking and unlocking of the grub screw 11. Similarly, the rectangular recess 19 in the plate 5 may be somewhat  
15       larger than the width of the grub screw 11.

      The upstanding ribs provided by the curved side edges 20 of the plate 5 may provide a low-friction contact surface between the plate 5 and the stay arm 2. If  
20       desired, a plastic spacer may be fitted under the top edge of the ring 4, to minimise friction between the ring 4 and the stay arm 2.

      In the embodiment illustrated in Figures 1 and 2, the  
25       stay arm assembly is locked by an anticlockwise movement of the key 13, when engaged in the screw 11; and it is unlocked by a clockwise movement of the key 13.

      In an alternative embodiment, locking may be achieved  
30       by a clockwise movement of the key 13, and unlocking by an anticlockwise movement. One way of achieving this is simply to alter the handing of the thread of the grub screw 11 and its bore in the retainer pin 3.

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An alternative method is to modify the arrangement such that the grub screw 11 protrudes out of the opposite side of the retainer pin 3, to achieve locking. The plate 30 that is shown in Figure 3 may be used as an alternative to the plate 5, in such a modified arrangement.

An example of such a modified arrangement will now be described briefly. It may be taken that, unless mentioned to the contrary, the parts 2, 3 and 4 may be generally as shown in Figures 1 and 2.

The plate 30 shown in Figure 3 has a substantially D-shaped recess 31 formed therein. There is provided a protrusion 32 along the straight edge of the D, substantially centrally thereof. Underneath the protrusion 32, there is formed in the side wall of the plate 30 a part-circular recess 33.

In use, the plate 30 is positioned within the ring 4, with the recess 33 in register with the hole 16. Thus, with the window stay assembly in a closed position, the shaft of the key 13 may be passed through the hole 16 and the recess 33, to engage in the head of the grub screw 11.

In order to lock the assembly, the grub screw 11 is turned a number of times clockwise by means of the key 13, until it protrudes out of the right hand side of the retainer pin 3, as seen in Figures 1 and 2. At this point, the head of the grub screw 11 is either flush with the retainer pin 3, or preferably, a little way within the screw threaded bore. The protruding part of the grub screw 11 is located in the circular part of the D-shaped recess 31, and extends over the lower surface of the ring 4.

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Thus, in this position, the stay arm assembly may be used generally as outlined above, to allow the window to be opened by a limited amount, and the blind holes 6 in the stay arm to be engaged selectively with the spigot 8 at the top of the retainer pin 3.

In order to unlock the assembly, the window is again placed in a closed position, so that the hole 16 and the recess 33 are in register with the grub screw 11. This permits access of the key 13, by which the grub screw 11 may be turned anticlockwise a number of times.

In this arrangement, the rearward travel of the grub screw 11, as it is being rotated anticlockwise, is limited by the protrusion 32, against which the head of the grub screw 11 eventually abuts. This prevents the head of the grub screw 11 engaging with the recess 33 (or the hole 16), which might otherwise cause interference. With the head of the grub screw 11 abutting the protrusion 32, the stay arm 2 may be lifted together with the ring 4 and plate 30, which are then simply disengaged from the retainer pin 3, much as before.

It is preferred that, when the grub screw 11 is in its rearmost position, it protrudes from the retainer pin 3 only a small amount. The diameter of the hole 15 in the lower face of the ring 4 may be sufficient to accommodate this amount. Alternatively, a small rectangular recess may be provided adjacent the hole 15, to accommodate the grub screw 11 when in its rearmost position.

When it is desired to relock the stay arm assembly, the stay arm 2 together with the ring 4 and plate 30 are dropped over the retainer pin 3, as before. It may be found that, when this is done, the protrusion 32 rests on

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the grub screw 11. Then, upon screwing the grub screw 11 clockwise, by means of the key 13 passing through the hole 16, the plate 30 is free to drop down to its final position. Upon screwing the grub screw 11 sufficiently forward, by clockwise rotation of the key 13, the grub screw 11 again projects over the lower surface of the ring 4, to lock all of the parts securely together.

In a preferred arrangement, the grub screw 11 is provided with a head that is somewhat flared outwardly, and the mouth of the bore 10 is correspondingly flared. This can have two advantages. Firstly, the head of the grub screw 11 and the flared mouth of the bore 10 can co-operate to limit forward movement of the screw 11, and thereby define the locking position of the screw 11. Secondly, the flared mouth of the bore 10 can guide the shaft of the key 13 into engagement with the head of the grub screw 11.

The protrusion 32 may alternatively extend the full length of the straight side of the D-shaped recess 31. This may be easier to fabricate.

If desired, the grub screw 11 may be provided, at at least its free end (which protrudes from the retainer pin 3 in a locking position) with at least one flat which engages the lower face of the ring 4, in a locked position. Such a flat may prevent any tendency for the grub screw 11 to rotate - for example, due to vibration and/or during repeated rotational movements of the stay arm assembly during opening and closing of the window.

Thus, in both embodiments illustrated and described above, there may be provided simple and effective window stay arm assemblies having locking arrangements such that,

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when they are locked, the window may be opened by only a limited amount but, when unlocked, the window may be opened as wide as desired. The locking means may be operated only when the window is substantially closed.

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Although the illustrated embodiments employ grub screws to provide a projection which engages between the retainer pin 3 and the ring 4, alternative projections may be provided. For example, the retainer pin 3 may be provided with a spring loaded projection and a ratchet mechanism by means of which the projection may be either withdrawn within the retainer pin 3 or projected therefrom, in response to the turning of a key.

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CLAIMS

1. A stay arm assembly comprising:

5 a stay arm (2);

a retainer (3) for retaining the stay arm in at least one desired position; and

10 a ring (4) which passes around the stay arm and engages the retainer so as to allow limited sliding movement of the stay arm with respect to the retainer and the ring; and characterised by having

15 a releasable locking means for locking the ring on the retainer said locking means being releasable to allow the ring to be disengaged from the retainer to permit extended movement of the stay arm with respect to the retainer, the locking means comprising a locking member  
20 (11) which engages with the retainer and a key (13) for actuating the locking member, the ring being provided with a hole through which the key may pass, and the arrangement being such that the key may pass through the hole to actuate the locking member, only when the retainer and the  
25 ring are in a predetermined angular juxtaposition.

2. A stay arm assembly according to claim 1, wherein said locking member comprises a projection which is moveable towards and away from a position in which it  
30 projects from the retainer to prevent the ring from being removed from the retainer.

3. A stay arm assembly according to claim 1, wherein said locking member comprises a screw-threaded member  
35 which engages a tapped bore in said retainer and is

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screw-threadedly adjustable towards and away from said position.

4. A stay arm assembly according to claim 1, wherein there is provided adjacent said hole an abutment surface against which a head of said locking member may abut, to prevent movement of said locking member into a position in which its head engages with said hole.
5. A stay arm assembly according to claim 1, wherein said retainer comprises a pin which engages the stay arm and/or the ring.
6. A stay arm assembly according to claim 1, wherein said juxtaposition corresponds to a closed position of a closure member with respect to a frame, to which closure member and frame said stay arm and retainer are secured, in use.
7. A stay arm assembly according to any one of the preceding claims, further comprising a plate which is so interposed between said stay arm and said ring as to at least partly cover said locking member.
8. A stay arm assembly according to claim 3, wherein said screw-threaded member comprises a grub screw.
9. A stay arm assembly according to claim 3, wherein said screw-threaded member has a flared head and said bore has a flared mouth with which said head engages to limit travel of the screw-threaded member within said bore.
10. A stay arm assembly according to claim 3, wherein said screw-threaded member has a head formed with a



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polygonal socket and said key comprises a polygonal spigot to engage said socket.

11. A stay arm assembly according to claim 7, wherein an abutment surface is provided on said plate.

12. A stay arm assembly comprising;

a stay arm;

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a retainer for retaining the stay arm in at least one desired position; and

a ring which passes around the stay arm and engages the retainer so as to allow limited sliding movement of the stay arm with respect to the retainer and the ring; said stay arm assembly characterised by having

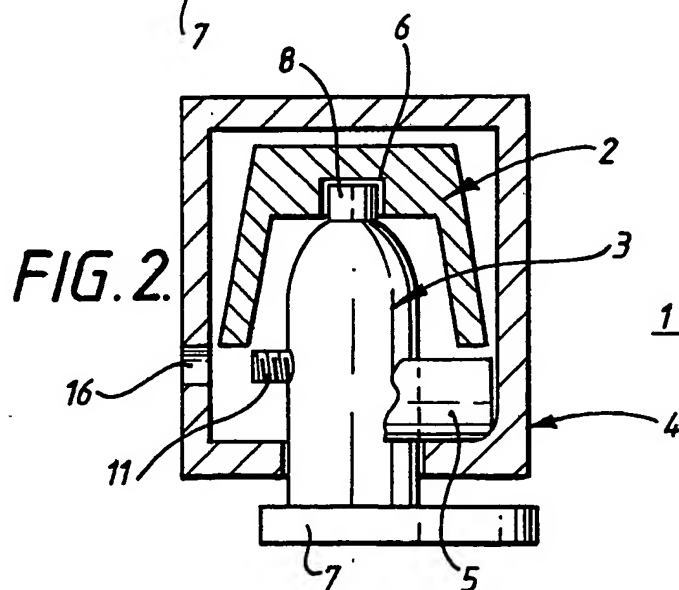
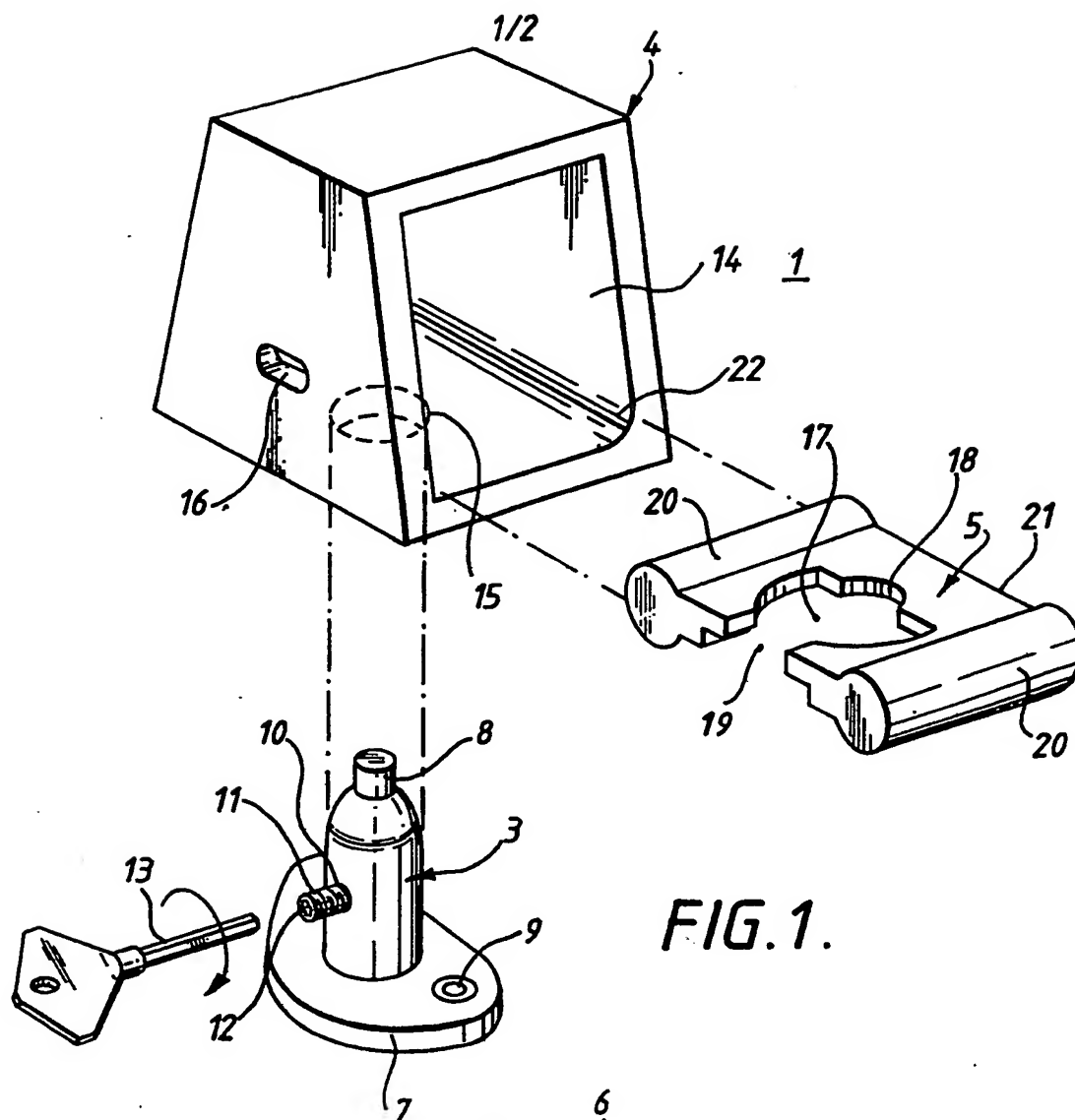
a releasable locking means for movably locking the ring to the retainer such that the ring is angularly moveable with respect to the retainer said locking means being accessible for effecting a release operation thereof to allow the ring to be disengaged from the retainer only when the retainer and the ring are in a predetermined angular alignment.

13. A stay arm assembly according to any one of claims 1, to 6 or 8, to 12, adapted for use with an opening sash window, the stay arm and retainer being adapted to be secured to an opening sash and a frame of a window.

14. A stay arm assembly substantially as hereinbefore described with reference to the accompanying drawings.

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15. An opening sash window provided with a stay arm assembly according to any one of claims 1 to 6, or 8 to 12, or claim 14.



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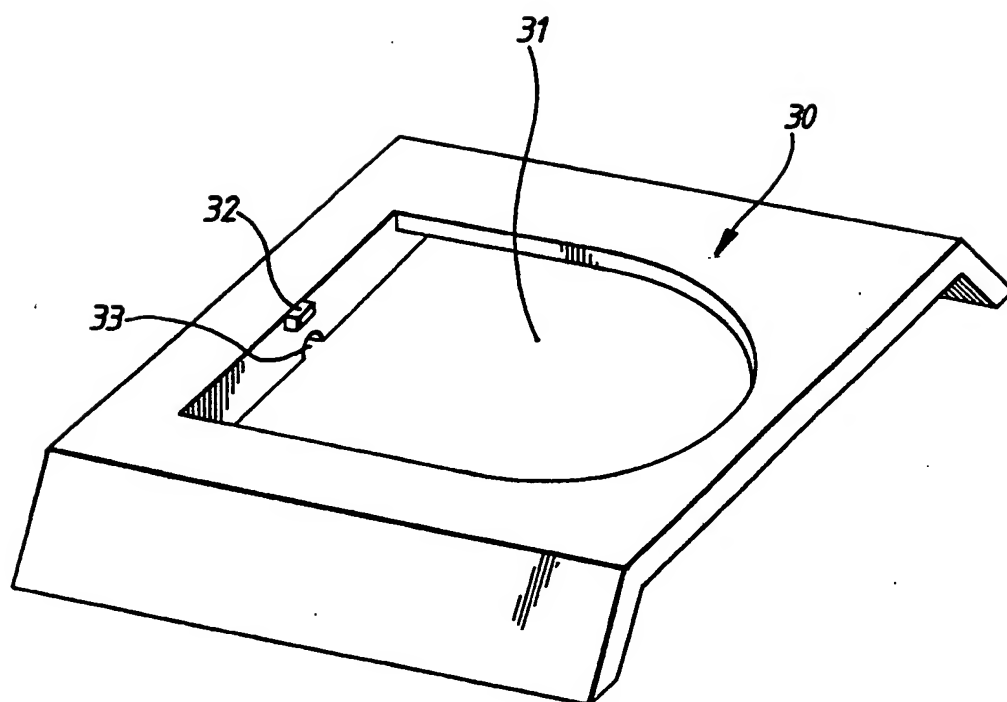



FIG. 3.

## INTERNATIONAL SEARCH REPORT

PCT/GB 91/00763 .

International Application No

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.Cl. 5 E05C17/18		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl. 5	E05C	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>*</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
A	DE,C,428 469 (BEHMER) April 15, 1924 ---	
A	GB,A,2 178 477 (RANKIN) February 11, 1987 cited in the application ---	
A	GB,A,2 162 242 (RANKIN) January 29, 1986 cited in the application ---	
<p><sup>*</sup> Special categories of cited documents : <sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search 14 AUGUST 1991		Date of Mailing of this International Search Report 09.09.91
International Searching Authority EUROPEAN PATENT OFFICE		Signature of Authorized Officer VAN BOGAERT J. 

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
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GB 9100763  
SA 47492

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-C-428469		None	
GB-A-2178477	11-02-87	None	
GB-A-2162242	29-01-86	None	

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